Qac | Qaf

Playas

Tule

જ

Tule

Bo

Holocene

QUATERNARY

TERTIARY

PERMIAN

PENN.

MISS.

DEVONIAN

SIL

AN

ORDOVIC

CAMB.

Regressive

Transgressive

Pleistocene

CORRELATION OF MAP UNITS

Qla

Qlf

Qeq

Qlg₁

Qlg₂

Qpm | Qsm

-10

α.

-15 ey

-20

- 25

- 30

Qlt

Qls

Qaf

Qed

Qel

Qla

DESCRIPTION OF MAP UNITS

Mc

SI

UNDIFFERENTIATED ALLUVIUM AND COLLUVIUM (late Pleistocene and Holocene) -- poorly sorted, primarily coarse- to fine-grained sediments consisting of fluvially reworked colluvium or alluvium with a significant colluvial component; occurs at and above the piedmont junction separating other Quaternary deposits below from bedrock above; estimated maximum thickness is 12 feet (3.7 m).

ALLUVIAL-FAN DEPOSITS (late Pleistocene and Holocene) -- coarseto fine-grained alluvium and debris-flow sediments deposited on
piedmont slopes since regression of Lake Bonneville from the
Bonneville shoreline; Qaf deposits are generally finer grained toward
the distal portion of alluvial fans, where they may be locally overlain
by eolian sediments; estimated maximum thickness is 20 feet (6 m).

EOLIAN DUNES (late Pleistocene and Holocene) -- well-sorted sand to

EOLIAN DUNES (late Pleistocene and Holocene) -- well-sorted sand to poorly sorted mixtures of sand, silt, and clay found in active and stable dunes; composition ranges from primarily gypsum, through mixed gypsum and nongypsum constituents, to primarily nongypsum minerals; 1.5 to 25 feet (0.5 to 7.6 m) thick.

GYPSIFEROUS EOLIAN SHEET SAND (late Pleistocene and Holocene)
-- primarily sand-sized gypsum deposited as a sand sheet mostly
northeast of the basin floor, which is the source of the gypsum
grains; from a few inches to over 25 feet (7.6 m) thick.

EOLIAN-REWORKED LACUSTRINE FINES (Holocene) -- dominantly marly but locally gypsiferous lacustrine fines; entrained from the valley floor as salt-bound marl pellets and redeposited on the valley floor in small shrub-coppice dunes overlying lacustrine marl; typically less than 3 feet (0.9 m) thick.

UNDIFFERENTIATED LACUSTRINE AND ALLUVIAL DEPOSITS (late Pleistocene and Holocene) -- poorly sorted, coarse- to fine-grained sediments composed of lake-reworked alluvial-fan deposits, fan-reworked lake deposits, and areas where lake and fan deposits are not distinguishable at the map scale; lake-reworked fan deposits consist of pre-Bonneville alluvial fans etched by shorelines; Qla becomes finer grained in the downslope direction; generally less than 7 feet (2 m) thick.

FINE-GRAINED LACUSTRINE DEPOSITS (late Pleistocene and Holocene) -- poorly sorted mixtures of sand, silt, clay, and marl typically found between the basin-floor marl flats and the piedmont zone; locally gypsiferous, saline, or reworked by fluvial or eolian processes; in many places the contact between Qlf and the marl flats is marked by a Holocene bluff; thickness ranges from a few inches to 20 feet (6 m).

YOUNG LACUSTRINE GRAVEL (Holocene) -- poorly sorted, pebbles and sand in a marly matrix deposited by regressive Lake Tule; many of the pebbles consist of broken tufa clasts or lithified Lake Bonneville marl; approximately 5 feet (1.5 m) thick.

INTERMEDIATE LACUSTRINE GRAVEL (late Pleistocene) -- moderately well-sorted, subrounded to rounded, pebbles and cobbles; deposited by coastal waves and currents of Lake Bonneville between about 19,500 and shortly after 14,000 years B.P.; maximum thickness is about 50 feet (15 m).

OLD LACUSTRINE GRAVEL (late Pleistocene) -- coastal sandy gravel deposited by transgressive Lake Tule between about 30,000 and 19,500 years B.P.; maximum thickness is approximately 20 feet

LAGOON DEPOSITS (late Pleistocene) -- silt, clay, and sand filling lagoons behind Provo shoreline gravel barriers; thickness not observed.

Qlm

LACUSTRINE MARL (late Pleistocene and Holocene) -- Lake Bonneville pristine white marl and sandy marl reworked by Lake Bonneville, regressive Lake Tule, and post lacustrine fluvial processes; calcareous silt to calcareous sandy silt; ostracodes are abundant and gastropods are occasionally found; locally saline; thickness varies from a few inches to at least 20 feet (6 m) thick.

LACUSTRINE SAND (late Pleistocene) -- pebbly, marly sand that in many places overlies lacustrine marl; ooids and ostracode, gastropod, and carbonate-coated gastropod shells are common; deposited 10 to 125 feet (3 to 38 m) below the Provo shoreline during and shortly after Provo shoreline time; maximum thickness is approximately 15 feet (4.6 m).

carbonate precipitated in nearshore environments during and after Provo shoreline time; includes broken tufa clasts reworked by lacustrine and fluvial processes; principally found as a shelf lying 20 to 60 feet (6 to 18 m) below the Provo shoreline; from a few inches to 2 feet (0.6 m) thick.

PLAYA MUD (Holocene) -- thin deposits of clay, silt, and marl, with

LACUSTRINE TUFA (late Pleistocene and Holocene) -- calcium

ypm small amounts of sand, overlying basin-floor marl; chloride-rich; typically flooded.

MARSH DEPOSITS (Holocene) -- fine-grained sediments and marl found in association with springs and related high-ground-water areas on

in association with springs and related high-ground-water areas on the basin floor; generally saline and organic-rich; thickness not observed.

UNDIFFERENTIATED QUATERNARY AND TERTIARY DEPOSITS

QTu UNDIFFERENTIATED QUATERNARY AND TERTIARY DEPOSITS (Tertiary and early Quaternary) -- basin fill of interfingering alluvial, eolian, lacustrine, playa, and spring deposits; estimated maximum

thickness is 6,900 feet (2,100 m) (see Allmendinger and others, 1983). Shown on cross section only.

ELY LIMESTONE (Permian-Pennsylvanian-Mississippian) -- primarily cherty limestone that is commonly bioclastic and fossiliferous; not exposed in this quadrangle, but shown in the subsurface on the

cross section; about 2,000 feet (600 m) thick.

CHAINMAN SHALE (Mississippian) -- primarily dark-gray shale with interbeds of limestone and siltstone; subsurface only in this quadrangle; about 1,500 feet (460 m) thick

quadrangle; about 1,500 feet (460 m) thick.

JOANA LIMESTONE (Mississippian) -- light- to medium-dark-gray, generally coarsely crystalline fossiliferous limestone; total exposed thickness is 85 feet (26 m); base and top are concealed by Quaternary deposits.

PILOT SHALE (Mississippian and Devonian) -- the exposed lower part of the Pilot Shale is mostly thinly interbedded calcareous siltstone, shale, and fine-grained sandstone that includes about 5% silty limestone, which occurs in 1 to 2 foot (0.3 to 0.6 m) beds scattered throughout the section; exposed thickness is 410 feet (125 m); the upper part of the Pilot Shale is buried beneath Quaternary deposits;

regional thickness is 700 to 1,090 feet (210-330 m).

GUILMETTE FORMATION (Devonian) -- the exposed upper part of the Guilmette Formation is interbedded limestone and dolomite that includes a 33 foot (10 m) yellowish-gray, crossbedded sandstone about 260 feet (80 m) below its top; limestone beds are generally medium gray to medium dark-gray, medium to thick bedded, and medium to coarse grained; dolomite beds are similar to the limestone but are dark brownish gray; spherical stromatoporoids are common in the carbonate units, and "spaghetti" stromatoporoids are abundant in a few beds; the upper Guilmette Formation is resistant and forms the backbone of a hogback; exposed thickness is 360 feet

(110 m); regional thickness is 2,000 to 2,650 feet (600-800 m). SIMONSON DOLOMITE (Devonian) -- predominantly medium dark-gray and medium-light-gray, fine- to medium-grained, thin- to thick-bedded dolomite that weathers dark gray to dark yellowish brown; exposed thickness about 150 feet (45 m); complete thickness in nearby areas is 600 to 1,000 feet (180-300 m).

SEVY DOLOMITE (Devonian) -- predominantly medium-gray, finely crystalline, medium-bedded dolomite that weathers light gray to yellowish gray; some beds are laminated; locally scattered quartz grains of thin brown sandstone beds are present; exposed thickness about 700 feet (210 m); regional thickness about 1,200 feet (360 m).

LAKETOWN DOLOMITE (Silurian) -- the lower 360 feet (110 m) is dark-brownish-gray, medium-crystalline, medium- to thick-bedded dolomite that forms ledges and cliffs; the upper 560 feet (170 m) includes two conspicuous thick bands of pinkish-gray dolomite separated by bands of dark-gray dolomite; the uppermost dark-gray dolomite includes as much as 20% black chert as bedded nodules, and abundant poorly preserved traces of spherical stromatoporoids, colonial corals, and thin-shelled brachiopods; the Laketown Dolomite is at least 920 feet (280 m) thick.

Ces ELY SPRINGS DOLOMITE (Upper Ordovician) -- the lower 530 feet (160 m) is dark-brownish-gray, fine-grained dolomite that contains as much as 2% black chert nodules; the upper 90 feet (27 m) is medium-gray, thin- to medium-bedded, slope-forming dolomite; total thickness 620 feet (187 m).

EUREKA QUARTZITE (Middle Ordovician) -- white to yellowish-gray, medium- to thick-bedded quartzite; only the upper 120 feet (37 m) is exposed in this quadrangle; regional thickness is 300 to 500 feet

(90-150 m).

POGONIP GROUP (Middle and Lower Ordovician) -- not exposed in this quadrangle but shown on the cross section in the subsurface; consists of thin-bedded, silty, bioclastic gray limestone, interbedded with light-olive-gray shale; regional thickness 1,900 to 3,400 feet

(580-1,000 m)

1,690 feet (505-515 m).

NOTCH PEAK FORMATION (Upper Cambrian and Lower Ordovician) -the lower exposed 400 feet (120 m) of this formation consists of
medium-gray, thick-bedded limestone banded with light-gray layers;
it forms light-gray cliffs in the southern exposures; the upper 630
feet (190 m) is mostly dark-brownish-gray dolomite with broad
bands which weather moderate orange-pink; total exposed thickness
is 1,030 feet (310 m); neither the top nor the bottom of the Notch

UPPER MEMBERS OF THE ORR FORMATION (Upper Cambrian) -interbedded shale and limestone; 600-700 feet (180-215 m) thick;
not exposed in the quadrangle but shown on cross section.

Peak is exposed in the quadrangle; regional thickness is 1,660 to

BIG HORSE LIMESTONE OF THE ORR FORMATION (Upper Cambrian)
-- medium-gray, thick-bedded, bioclastic limestone that contains
oolites and indistinct biohermal structures; only the upper part of the
Big Horse Limestone is exposed in the quadrangle; regional total
thickness is 715 feet (218 m).

Qlg₁/Qlm STACKED MAP UNITS -- Indicate thin or discontinuous cover of one unit over another unit; the uppermost unit is indicated by color on the map.

MAP SYMBOLS

Contact

Fault - dashed where inferred; dotted where concealed; bar and ball on downthrown side

Strike and dip

Anticline

MDp

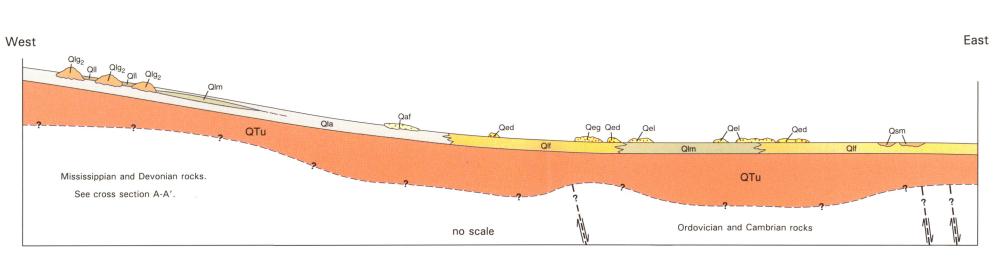
BL -- Lowest Lake Bonneville shoreline in Tule Valley

тн — тн -- Highest Lake Tule shoreline (pre-Lake Bonneville)

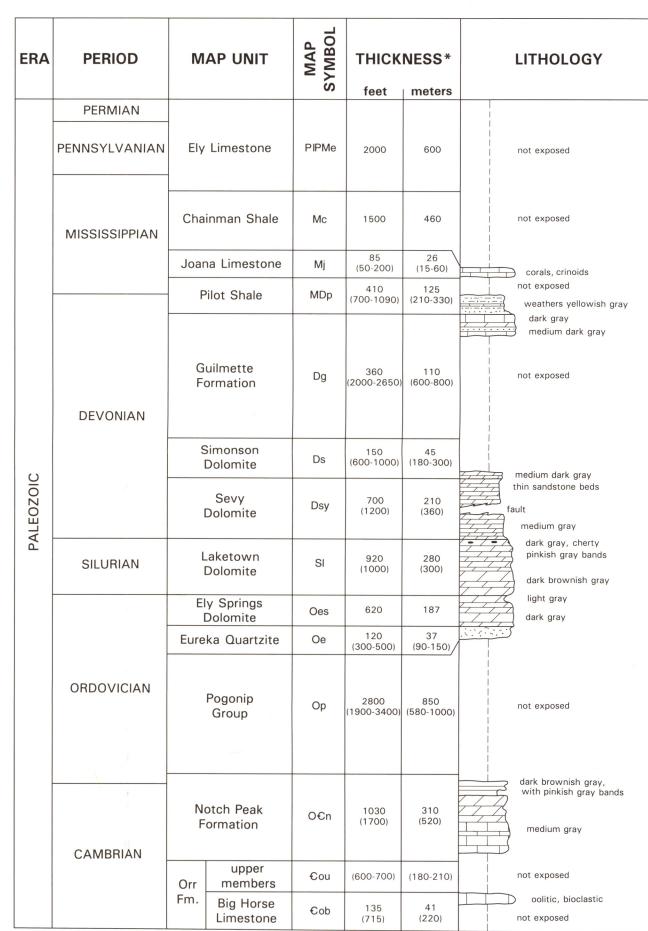
* Radiocarbon sample site

X Gravel pit

x_g Gypsum pit



Schematic cross section showing the relationships of the Quaternary deposits. QTu represents undifferentiated Quaternary-Tertiary basin-fill deposits.



*Regional thickness shown in parentheses

